UNIVERSITI TEKNOLOGI MARA

POLYCYCLIC POLYPRENYLATED ACYLPHLOROGLUCINOLS FROM THE BARK OF *Mesua ferrea* AND THEIR ANTI-DIABETIC ACTIVITY

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of the requirements for the degree of
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CONFIRMATION BY PANEL OF EXAMINERS

I certify that a Panel of Examiners has met on 7th March 2014 to conduct the final examination of Nurulfazlina Edayah Binti Rasol on his Master of Science thesis entitled "Polycyclic Polyprenylated Acylphloroglucinols from The Bark of *Mesua ferrea* and Their Anti-diabetic Activity" in accordance with Universiti Teknologi MARA Act 1976 (Akta 173). The Panel of Examiners recommends that the student be awarded the relevant degree. The panel of Examiners was as follows:

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AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulation of Universiti Teknologi MARA. It is original and is the result of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any other degree of qualification.

I, hereby, acknowledge that I have been supplied with Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

The ethyl acetate extract of the bark of *Mesua ferrea* from Clusiaceae family was studied for its chemical constituent's together with α-amylase and α-glucosidase inhibitory activities for potential anti-diabetic properties. The phytochemistry investigation resulted in the isolation of seven new polycyclic polyprenylated acylphloroglucinols of type B(I). Various chromatographic techniques were used in the isolation process. For fractionation, VLC, TLC and MPLC were employed. Purification of the compounds was accomplished using repeated HPLC technique due to very close retention time. Structures of the isolated compounds were established by means of spectroscopic methods which includes 1D-NMR (^{1}H and ^{13}C), 2D-NMR (COSY, HSQC, HMBC, NOESY and TOCSY), UV, IR and LCMS. The compounds were named mesuaferroic acid A, mesuaferroic acid B, mesuaferroic acid C, mesuaferroic acid D, mesuaferroic acid E, mesuaferroic acid F and mesuaferroic acid G. Polycyclic polyprenylated acylphloroglucinols have never been reported in *Mesua* species before. All the extracts and isolated compounds were subjected to α-amylase and α-glucosidase inhibitory assays for potential anti-diabetic properties. The results obtained from both assays indicate that the ethyl acetate extract has potential for anti-diabetic with moderate α-amylase and strong α-glucosidase inhibitory activity. The hexane extract showed strong inhibition properties for both assays and methanol showed strong α-amylase but did not show α-glucosidase inhibitory activity. Of the seven pure compounds, mesuaferroic acid D, mesuaferroic acid E and mesuaferroic acid F may be regarded as having moderate anti-diabetic property with IC_{50} values of 345.87 μg/ml, 260.97 μg/ml and 349.50 μg/ml, respectively in the α-glucosidase inhibition assay as compared to 1-deoxynojirimycin standard IC_{50} values of 102.82 μg/ml.

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